receiving the feedback position signal, and outputting an upper limit and a lower limit of current section; a comparing unit, receiving the FRAMESYNC per FODR, the upper limit and lower limit of the current section and outputting the optic pick-up head position signal.

[0014] The various objects and advantages of the present invention will be more readily understood from the following detailed description when read in conjunction with the appended drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Fig. 1 is a front schematic view of a prior art compact disk.

[0016] Fig. 2 is a schematic view showing the data signal of a compact disk in the present invention.

[0017] Fig. 3A is a schematic view showing the virtual section of the compact disk.

[0018] Fig. 3B is a schematic view showing the setting of the virtual sections in the present invention.

[0019] Fig. 4A is a schematic view of a position detector of the present invention.

[0020] Fig. 4B is a schematic view of a position condition detecting unit of the present invention.

[0021]Fig. 4C is a circuit block diagram of the position condition detecting unit.

[0022] Fig. 5 shows signal waveforms of Fig. 4A.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] Referring to Fig. 2, a structure schematic view of data signal is illustrated. The data signal has a form of a square wave. Therefore, in the data storage system, as an optic disk drive reads data, the data recorded on the compact disk must be digital. However, in the practical application, data

is generated as analog data. Thus, in processing, the analog signal must be converted into digital signal. In the general compact disks, a data slicer is used to generate digital signal. Then, the analog signal is compared with the slice level. If the analog signal is larger than the slice level, then the digital signal is 1 (high level). On the contrary, the digital signal is 0 (low level). Thus, signal with a high level or a low level is a digital signal.

[0024] By a digitized process, the desired message is stored in 0 or 1. With the variation of positions, different signal structure is generated. Thus this signal is stored in the recording section in a compact disk and therefore, it is appreciated that the data signal has a predetermined length which is unchanged with the variation of position. That is, the structure of a digital signal is determined according to the frequency of the sampling as modulating an analog / digital signal. The length of the data stored in a compact disk is fixed in a compact disk. Therefore, the length of unit data in each position on the compact disk is fixed, which is not varied with the distance to the center.

[0025] In the method for determining a position of an optic pick-up head according to the present invention, a virtual division for disk is performed. In reading data in the compact disk, the optic pick-up head in an optic disk drive is used to scan data in the recording section. Therefore, the compact disk is divided properly into several frames so that the optic pick-up head may search data steadily and rapidly and thus, reading of the optic pick-up head can be performed rapidly.

[0026] With reference to Fig. 3A, a schematic view for virtually dividing a compact disk into sections in the present invention is illustrated. In the present invention, through a properly virtual division, in data reading at a steady condition, the position of the optic pick-up head is searched rapidly. Furthermore, the processing time in the succeeding reading can be executed quickly. With reference to Fig. 3A, in the present invention, a compact disk is virtually and rapidly divided into 16 section, for example, in the innermost is a first section 21, and in the outermost cycle is a sixteenth section 22, while in the physical structure of a compact disk, this division is not existed. Each section includes a plurality of frames. Each frame has 588 bits (in CD), or 1488 bits (in DVD). A frame synchronous signal (FRAMESYNC) is located between two frames. In reading data from a disk,

as a FRAMESYNC is detected, it represents beginning of a frame. Then, the number of frames for a section is known from the number of cycles in scanning the section and number of the FRAMESYNCs per cycle. Another, the number of frames through one cycle of the compact disk can be acquired from the number of the detected FRAMESYNC.

[0027] With reference to Fig. 3B, a schematic view showing a virtual division of a compact disk according to the present invention is illustrated. In the embodiment illustrated in Fig. 3B, the compact disk is virtually divided into 16 sections. The first section includes 84 to 88 FRAMESYNC signals; the second section includes 88 to 97 signals and so on. Smith trigger is used for avoiding the jitter of the optic pick-up head between various sections. For example, the determination of the position of the optic pick-up head does not leave from the first section into the second section until 88 FRAMESYNC signals are detected in one rotator of disk. If the number of FRAMESYNC signals is reduced to 87, then to the position is not changed as the first section only if the number of FRAMESYNC is reduced to 84. The function for determining the division of the frames is: FODR = constant $\times$ $(2\pi \times R / B) \times 7350$, where FODR (frequency of disk rotation) is the rotation frequency of the disk; R represents the radius of the concentric cycle at the position of the optic pick-up head; and B is the rotating or moving speed of the optic pick-up head.

[0028] Referring to Fig. 4A, a position detector 40 in the control circuit for control the reading action of the optic pick-up head in an optic disk drive according to the present invention is illustrated. This position detector 40 serves to detect the position of the optic pick-up head. The position detector 40 receives a frequency variation (FA) of the data phase lock loop, a track on success signal (TOS), and a frequency of disk rotation signal (FODR). After being processed in the position detector 40, a pick-up head ready signal (PUHRDY) is output, then the position of the optic pick-up head on the compact disk is ready to be detected.

[0029] The pick-up head ready signal output from the position detector 40 is effective as the track on success signal is reset. Therefore, if the position detector 40 receives a track on success signal and after the signal is processed in the position detector, the output pick-up head ready signal is an